

## EXERCISE APPARATUS

### TECHNICAL FIELD

5 The present invention relates to an apparatus for so-called slot-in exercise in a workplace environment, or for warming-up before taking part in athletics or sports, and comprising a resistance device disposed to exercise resistance to a movement to which it is subjected by a user, the resistance device having a gripping member by means of which it is activated by the user.

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### BACKGROUND ART

An infinite number of different types of exercise equipment is previously known in the art. A large proportion of these are designed in such a manner that they are exclusively for use in a gymnasium environment.

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People who exercise at a gymnasium often do so for the purpose of bodybuilding, improving fitness or to lose weight. Such people are often highly motivated and are quite happy to devote considerable time to both travel to and from the gymnasium as well as time in the actual exercise at the gymnasium.

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The present invention does not relate to exercise of the type which is normally carried on in a gymnasium environment or possibly in the home using exercise kits which are basically designed for the gymnasium environment.

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Instead, the present invention relates to a different type of exercise or rather muscle-loading, which can be called slot-in exercise and whose purpose is to increase oxygenation, blood circulation and the removal of waste products, which may cause pain, inflammation in muscles and tendons. The muscles which may come into consideration for this type of exercise are muscles which suffer from, or are in the process of suffering from permanent strain syndromes.

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Strain syndromes occur if a muscle or muscular group carries out monotonous, repetitive working movements with quite slight muscle loading and where the same working phase is repeated for lengthy periods of time.

- 5 Paradoxically, the above-described problems have increased at the same rate as attempts have been made to create ever better ergonomics in the labour environment. Improved ergonomics entails often that the musculature is relaxed, i.e. that the loading become less and that the muscular movements become shorter or smaller, in other words conditions which generate strain syndrome.

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- The problems that lie behind the formation of strain syndrome entail that, already after a short period of repetitive, low stress movements because of insufficient blood circulation and oxygenation, waste products and inflammatory substances accumulate in the musculature. This entails that the musculature is not capable of maintaining the precision that is often  
15 required. The body then reacts in that the musculature is tensed in order to regain precision, which in turn results in various forms of muscular contraction pain.

- In order to remedy the above-outlined problems, it is more important that the relevant muscle groups actually are made to carry out stress work, which differs from the monotonous work  
20 movements, than to carry out exercise movements which are carefully adapted for bodybuilding, increasing fitness or losing weight. It is also of great importance that the stress movements can be carried out as soon as fatigue symptoms occur in the strained muscles, which in practice means several times during a normal working day. There is no time for travel to a gymnasium, change of clothing, shower etc., in this type of exercise, so-called slot-  
25 in exercise. Ready access to the slot-in exercise is thus an imperative requirement.

- Those stresses that are applied to muscles or muscle groups should not be too great and clearly less than that which is relevant to exercise for improving fitness, bodybuilding or losing weight.

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- So-called pause gymnastics are also previously where work is briefly discontinued and a short period of gymnastics is carried out. However, such a period of gymnastics does not give the requisite stress level on the pertinent muscles and muscle groups.

Another type of injury occurs when the person executes large repetitive muscle movements in a forward leaning position. The large muscle groups take up the large forces and the person gets the incorrect balance and structure in the skeleton and musculature. The person often becomes bent forward and the shoulders lower down in a slightly forward slanting posture.

5 The person often experiences discomfort in the back and shoulders. The general posture deteriorates, which results in pain and reduced mobility.

These problems have become aggravated at the same rate as people are in considerably poorer shape compared with previously and, as a result, are less capable of managing repetitive

10 movements over a lengthy period of time. The problems have also become aggravated because working duties are more monotonous than before.

As one example of position and strain, mention might be made of a person digging with a spade. This is a forward bent position where the large muscles of the front of the body and the

15 large lumbar muscles are subjected to considerable strain. Other professional groups that suffer are assembly workers in mass production, hairdressers, cleaners and even sportsmen and women such as, for example, golfers.

In the practice of sports and athletics, it often happens that the sportsman/woman involved

20 begins activities while insufficiently warmed-up or softened. The risk of injury is obvious.

There are already a huge number of dismountable exercise implements and kits available on the market for exercise equipment that can be mounted on furniture, such as tables and chairs. The exercise equipment, which can be employed on chairs in an office environment and

25 various other labour environments are disclosed, for example in USPS 6,099,445; USPS 6,013,014 and USPS 5,324,243. These prior art exercise devices and kits consist of many different parts and are difficult to both assemble and use, for which reason they do not constitute a ready alternative when a large number of relatively short periods of exercise are to be carried out during a working day.

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## PROBLEM STRUCTURE

The present invention has for its object to design the apparatus intimated by way of introduction such that it obviates the shortcomings in the prior art technology. In particular,

the present invention has for its object to design the apparatus such that it will be simple, economical and versatile and that it may conveniently be used several times a working day by being readily available at each individual worksite.

## 5 SOLUTION

The objects forming the basis of the present invention will be attained if the apparatus intimated by way of introduction is characterised by a spacer of a predetermined length at least during use, the resistance device being connected to a first end region of the spacer and  
10 an abutment which is disposed at an opposing end region of the spacer and which is disposed to be brought into contact with the user and transfer thereto at least a part of the reaction forces that are transferred to the spacer from the resistance device.

In a first embodiment, the spacer is in the form of a bar.  
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This embodiment is economical and simple to manufacture and may readily be stowed away between periods of use.

In a second embodiment, the spacer consists of an item of furniture, in particular a table top.  
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In this embodiment, the exercise apparatus according to the present invention may be readily available in order to be able to be used conveniently on any desired occasion.

## 25 BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The present invention will now be described in greater detail hereinbelow, with reference to the accompanying Drawings. In the accompanying Drawings:

Fig. 1 shows, straight from the side and straight from above, a first embodiment of  
30 the present invention;

Fig. 2 shows, straight from the side and straight from above, a second embodiment of the present invention;

- Fig. 3 shows, straight from the side and straight from above, a third embodiment of the present invention;
- 5 Fig. 4 shows, straight from the side and straight from above, a fourth embodiment of the present invention;
- Fig. 5 shows, straight from the side and straight from above, the apparatus according to the present invention mounted on a table,
- 10 Fig. 6 shows, straight from the side and straight from above, one embodiment where a table top forms a spacer included in the apparatus according to the present invention;
- 15 Fig. 7 shows, straight from the side, one embodiment where the table top forms the spacer, partly in the lowered, inactive state and partly in the raised, active exercise state;
- Fig. 8 shows two views corresponding to those of Fig. 7 showing a modified embodiment;
- 20 Fig. 9 is a top plan view of the embodiment illustrated in Fig. 8;
- Fig. 10 shows, straight from the side, a modified embodiment corresponding to the embodiment of Fig. 8;
- 25 Fig. 11 shows, straight from the side, a modified embodiment corresponding to the embodiment of Fig. 7;
- Fig. 12 shows, straight from the side, a modified embodiment corresponding to the embodiment of Fig. 7;
- 30 Fig. 13 shows, straight from the side and straight from above, a further development of the embodiment of Fig. 3;

Fig. 14 shows, straight from the side and straight from above, a second embodiment of the apparatus according to the invention mounted on a table;

Fig. 15 shows, straight from the side and straight from above, the embodiment of Fig. 14 in a passive position of non-use.

Fig. 16 shows one embodiment of the present invention disposed on a mobile unit, in this case a cleaning trolley;

Fig. 17 shows one embodiment of the present invention disposed on a mobile unit, in this case a golf cart; and

Fig. 18 shows one embodiment of the present invention disposed on a mobile unit, in this case a golf bag.

## DESCRIPTION OF PREFERRED EMBODIMENT

In the following description, directional and positional disclosures will be made. These relate to a situation which is normal for the use of the apparatus according to the present invention during exercise.

In its most generic embodiment, the present invention relates to an apparatus for so-called slot-in exercise, which entails a relatively large number of short periods of exercise distributed throughout a working day, and where the intensity or strain level of the exercise is low. Such an apparatus has a spacer which, in its one end, or possibly movably along its length, supports a resistance device with a gripping member and which, in its opposing end, has an abutment in the form of a plate or bar which is intended for abutment against the body of the user. The resistance device has the property of exercising resistance against an exercise movement where, for example, the user pulls the gripping member secured in the resistance device. In that the reaction forces from pulling in the gripping member are transferred to the spacer and via this to the resistance device, the reaction forces will be absorbed by the user. This implies that the apparatus according to the present invention does not need to be fixed in such a manner that its anchorage can take up the forces that are generated during the exercise.

Regardless of the exact embodiment, the resistance device may be an elastically stretchable line which, with its one end, is secured in the spacer and, with its opposing, free end, supports the gripping member.

- 5 Further, the resistance device may, regardless of the exact embodiment, be formed in such a manner that it includes in itself a weight loading which exercises the above-mentioned resistance against the movement to which the gripping member of the resistance device is subjected during exercise.
- 10 Finally, the resistance device may also include a brake member which gives the requisite movement resistance on exercise.

Regardless of the embodiment, the resistance force which the abutment exercises on use is suitably adjustable.

- 15 In Fig. 1, the above-considered spacer has been given reference numeral 1, the resistance device which, in this embodiment, is doubled, has been given reference numeral 2 and the abutment has been given reference numeral 3. In addition, the gripping member has been given reference numeral 4.

- 20 In a practical embodiment, the resistance device 2 is, in this case, produced in the form of an elastically stretchable rubber rope which, by means of an anchorage 5, is secured in the one end region of the spacer 1. Possibly, the anchorage 5 may be displaceable in the longitudinal direction of the spacer towards the abutment 3. It will further be apparent from the Figure that
- 25 the gripping member 4 is in the form of an approximately rectangular loop which is secured in the opposing end of the elastically stretchable resistance device 2.

- From the upper part figure, it is apparent that the spacer 1 is of a predetermined length at least during use, and that this length is greater than the length of the resistance device 2 when this
- 30 is in the unloaded state. In addition, the length of the spacer 1 is, at least during use, substantially constant and independent of the force to which it is subjected under the action of the resistance device 2 during exercise. In one practical embodiment, the spacer 1 is designed as a bar or rod of plastic, wood or metal, possibly tubular in cross section. The spacer may also be of an adjustable length, for example be telescopic.

It will be apparent from the lower part of Fig. 1 that the abutment 3 is designed as a bar which is transverse in relation to the longitudinal direction of the spacer 1. It may also be in the form of a plate which roughly has its plane of extent vertically oriented. The abutment 3 is placed so as to be able to abut against the body of the user, preferably in the area of the abdomen or thigh region of the user. The area level with the navel of the user may also come into consideration.

In order that the apparatus according to Fig. 1 may readily be held in a position which is suitable for exercise, it is supported by or secured or securable on a support member 6 which has a bottom portion 7 intended to rest on a substrate, preferably the floor in the premises housing the workplace and the place of exercise.

The support member 6 is shown in Fig. 1 as a device whose only purpose is to keep the apparatus according to the present invention in a position suitable for use. However, the support member 6 may also be an item of furniture or part thereof, and as a result serve additional functions, see Figs. 5 and 6 below.

In the illustrated embodiment, the support member includes a vertical column 8 which is secured or securable in the central region of the spacer 1. The lower end of the column 8 is provided with the bottom portion 7 which, in the illustrated embodiment, includes a first bar 9 and a second bar 10. The two bars 9 and 10 form a cross where the first bar 9 is disposed approximately parallel with but a distance beneath the spacer 1, while the second bar 10 is approximately parallel with the abutment 3.

Fig. 2 shows a modified embodiment of the exercise apparatus shown in Fig. 1. In this embodiment, the spacer is disposed inclined, but, in the same manner as in Fig. 1, is in bar form. At the lower end, i.e. at that end which is turned to face away from the user, the spacer 1 has an anchorage 5 for the resistance device 2 with its gripping member 4. In its upper end, the spacer 1 has the abutment 3 which also in this embodiment is designed as a bar which is transversely directed in relation to the longitudinal direction of the spacer 1.

This embodiment is also provided with a support member 6 which has a bottom portion 7. The support member 6 includes a substantially vertical column 11 and the bottom portion is in the form of an approximately rectangular plate 12.



With its upper end, the vertical column 11 is secured or securable on the spacer 1 so that the spacer, in the longitudinal direction, is divided approximately in a ratio of 1:2, where the shorter section is located most proximal the abutment 3. The lower end of the vertical column 11 is connected to the centre point of that edge of the plate 12 which is turned to face in a direction towards the anchorage 5 of the resistance device 2. Also in this embodiment, the resistance device 2 is in double form.

The joining between the spacer 1 and the vertical column 11 is suitably divisible and adjustable so that the angle between these two components is varied in accordance with the wishes of the user.

The plate 12 is located in such a manner in relation to the abutment 3 that the user may conveniently stand on the plate at the same time as the abutment 3 abuts against the user's body.

Fig. 3 shows one embodiment which largely coincides with the embodiment according to Fig. 2. The most essential difference is however that the spacer 1 is disposed with an inclination which is opposite to that illustrated in Fig. 2. This inclination is also suitably adjustable.

Also in this embodiment, the plate 12 is placed in such a manner that the user may conveniently stand on the plate at the same time as the abutment 3 abuts against the user's body.

Fig. 4 shows a somewhat modified embodiment. In this embodiment, the spacer 1 is horizontal, designed as an elongate rod, and has anchorages for the resistance device 2 and the abutment 3 at its opposing ends. Also in this embodiment, the anchorage of the resistance device 2 in the spacer may be adjustable in its longitudinal direction.

At the anchorage 5 of the resistance devices 2 (which are doubled in this embodiment) in the spacer 1, there is provided an additional anchorage device 13 by means of which the apparatus according to the present invention may be secured to a wall 14.

The anchorage device 13 which, for example, may consist of a magnet attachment, a velcrotape® union or the like, is not intended to absorb the forces which are generated on

exercise using the apparatus according to the present invention. The sole purpose of the anchorage device 13 is to hold the apparatus according to the present invention in such a position that it may conveniently be used. Thus, like the above-described embodiments, the reaction forces which act from the resistance devices 2 on the spacer 1 will be absorbed by the user as a result of the contact of the abutment 3 against the user.

The embodiment according to Fig. 4 also displays a support member 6 with a bottom portion 7. In this embodiment, the support member 6 consists of a vertical rod 15 in whose lower end a transverse rod 16 is disposed approximately parallel with the abutment 3. The rod 15 may be of adjustable length for vertical adjustment of the abutment 3.

Fig. 5 shows an embodiment where the spacer 1 is placed on the upper side of a table top 17. In this embodiment, the table proper may be described as constituting the support member 6.

The anchorage 5 of the spacer 1 for securing the resistance device 2 has an engagement member 18 which is disposed in engagement with the one edge of the table top 17, in this case the distal edge. The engagement member 18 is designed in such a manner that it permits securing the spacer at this edge of the table.

At the opposing end of the spacer 1, there is disposed, as was mentioned above, the abutment 3 which, in this embodiment, is designed as a plate which has, on its side facing towards the user, a padding 19.

At the connection of the abutment 3 to the spacer 1, there is a second engagement member 20 which is disposed in engagement with the front edge of the table top 17. The engagement member 20 is designed in analogy with the engagement member 18, for which reason the apparatus according to the present invention may readily be mounted on the table top, but just as simply be removed from it.

In one variation of the embodiment according to Fig. 5, the engagement member 20 is absent. Instead, the engagement member 18 is designed in such a manner that the rod may be freely supporting on or over the table top 17. By pivoting the rod 15 in the engagement member 18 it is possible to realise a vertical adjustment of the abutment member 3.

In certain exercise movements it is important that the abutment member 3 and also the resistance device 2 are located so high above the table top that the hands of the user can swing in without hindrance over the table top.

- 5 In the embodiment according to Fig. 6, the table top 17 constitutes the spacer proper, while the table in its entirety can be described as constituting a support member 6. The anchorage 5 of the resistance device 2 has, in this embodiment, a first engagement member 18 which corresponds to the first engagement member in the embodiment according to Fig. 5.
- 10 Also in this embodiment, the abutment 3 is designed as a plate which is provided with a padding 19. The abutment 3 has a second engagement member 20 which is analogous with the engagement member illustrated in Fig. 5 with the same reference numeral.

- Also in the embodiment according to Fig. 7, the table top 17 constitutes the spacer according to the invention. For securing the resistance device 2, the table top has an anchorage 5 which is placed at the edge of the table top facing away from the user. The anchorage 5 is designed in such a manner that the resistance device 2 may simply be hooked into and unhooked from the anchorage. Possibly, the anchorage 5 may be designed to permit simple adjustment of the anchorage of the resistance device 2 in a direction towards the opposing edge of the table top 17.
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- The abutment 3 in this embodiment is designed as a plate which has a padding 19 on its front side. The plate 3 is connected to the table top 17 by the intermediary of a linkage 22 which is designed in such a manner that the plate may be located pivoted in beneath the underside of the table top 17 in a passive, non-operative position and be pivoted up to approximately vertical position in an active position of use.
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- The embodiment according to Fig. 8 and 9 is analogous with the embodiment according to Fig. 7, apart from the fact that the abutment 3, which is in the form of a plate which in its turn constitutes a part of the table top 17, is pivotal to an inactive position where the plate is retracted in the table top (as shown in the upper part view). In the position of use, as shown in the lower view, the plate is pivoted over the upper side of the table top so that it makes an angle therewith. The pivot angle may, if desired, be as large as approximately 90°.
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If a lower abutment area against the body of the user is desired, it is also possible to cause the plate to be pivoted downwards on the underside of the table top 17.

Fig. 10 shows an embodiment which is largely analogous with the embodiment according to Figs. 8 and 9. The difference in this case is that the anchorage 5 of the resistance device 2 is in turn secured in an anchorage 23 disposed in the under side of the table top 17 and by means of which the anchorage of the resistance device 2 is retractable to an inactive position under the table top 17.

10 The abutment 3 also has an anchorage 24 on the under side of the table top 17. By means of this anchorage 24, the abutment 3 is switchable between an upwardly directed position of use according to the lower part view and an inactive position where the abutment 3 is located on the under side of the table top 17.

15 Also in this embodiment, the table top naturally constitutes the spacer proper.

Fig. 11 shows an embodiment where the table top 17 constitutes the spacer and where the anchorage 5 of the resistance device 2 is secured in the upper side of an open-and-close lid 25 to a box 26 disposed on the under side of the table top 17. The box 26 is intended for storing the resistance device or devices 2 when not in use.

Securement of the abutment 3 designed as a plate is put into effect in the same manner as in the embodiment according to Fig. 7.

25 Fig. 12 shows an embodiment where the table top 17 constitutes the spacer. The anchorage 5 for the resistance device 2 is secured on a pivotal flap 27 which, in an inactive position, constitutes a part of the table top (see the upper part view) and which, in the active position of use, is pivoted upwards to make an angle with the table top 17.

30 The abutment 3 is of a design which is analogous with the embodiment according to Figs. 8 and 9.

In the foregoing, it was described how certain components included in the apparatus according to the present invention may be adjustable. In order to optimise and individually

adapt the muscular loading exercise which is carried out according to the invention, the apparatus according to the invention may be adjustable to a considerably greater degree than that described above. Figs. 13 to 15 show such embodiments.

5 Fig. 13 shows one embodiment which may be considered as a further development of the embodiment according to Fig. 3. The embodiment includes a support member 6 with a base plate 12 and a vertical or upwardly directed column 11 which, according to the double-headed arrow 28, is adjustable stepwise or continuously in the vertical direction to a lockable vertical adjustment position.

0 At the upper end of the column 11, there is disposed a lockable pivot 29 in which a rod 32, corresponding to (or constituting a part of) the spacer 1, is secured. As will be apparent from the arrows 30 and 31, the rod 32 is adjustable in both the longitudinal direction (the arrow 31) and in the vertical direction by rotating the pivot 29 (the arrow 30). The resistance device 2 and the gripping member 4 are designed in analogy with the above-described embodiments. 5 The position of the anchorage 5 along the rod 32 is also adjustable.

A slight distance beneath the pivot 29, there extends, in a direction away from the rod 32 and approximately at right angles to the rod 11, a short stub shaft 33 which is longitudinally 0 adjustable in accordance with the double-headed arrow 34 and in its free end carries the abutment 3. The stub shaft 33 can also be pivotal so that extra vertical adjustment of the abutment 3 is possible.

Fig. 14 shows a position of use and Fig. 15 a passive, non-use position of an embodiment 5 where a table with a table top 17 fulfils the function of support member 6. Apart from the support member, this embodiment has fundamental similarities with the embodiment according to Fig. 13. Consequently, the same reference numerals will be employed as in Fig. 13.

0 At the one edge of the table top, there is disposed a releasable anchorage 35 which has a double joint 36 with horizontal pivot axis. In the double joint 36 there is adjustably secured an upwardly directed arm or rod 32 which is wholly analogous with that illustrated in Fig. 13. Further, there is secured in the double joint 36, a short arm or stub shaft 33 which is analogous with that shown in Fig. 13, but which in addition is pivotal in the vertical direction

in accordance with the arrow 37 and also supports the abutment 3 in its free end. Also in this embodiment, the anchorage 5 for the resistance device 2 may be displaceable in the longitudinal direction of the rod 32.

- 5 Fig. 15 shows the above-described embodiment collapsed to a passive, non-use position of rest. It will be apparent from the Figure that both arms 32 and 33 are pivotal so far from their positions of use shown in Fig. 14 that they are located below the level of the table top 17 and are preferably substantially downwardly directed.
- 10 According to the present invention, there may be included in the apparatus a number of sensors for sensing and registering, for example counter force and protraction length of the resistance device 2, the number of protractions and their registration time, etc., in other words parameters that show that a user has correctly completed a predetermined exercise programme, or that may be employed for producing statistics.
- 15 The sensors also suitably include such as are employed for sensing and registering selected individual settings where the apparatus according to the present invention is individually adapted or optimised.
- 20 The information gathered by the sensors which may be registered and stored in a computer at the workplace may, for example, be employed for rewarding a user who has correctly completed his or her exercise programme or for facilitating adjustment (individual adaptation) of one example of the apparatus according to the present invention.
- 25 In the embodiments according to Figs. 16 to 18, the subject matter of the present invention is applied on or includes a mobile unit. Also in these embodiments, the same reference numerals have been used as in the above-described embodiments.
- 30 According to Fig. 16, a spacer 1 is disposed on a cleaning trolley which serves the function of support member 6. The spacer is applied at the handle area of the cleaning trolley via a pivot by means of which the spacer can be pivoted to an inactive position along the cleaning trolley. The pivot 38 also serves for vertical adjustment of that end of the spacer which is provided with the abutment 3 of the embodiment.

Also in this embodiment, the resistance device 2 has a gripping member in its one end and is connected via an anchorage 5 to the spacer 1. As is apparent from the arrows, the anchorage 5 is movable along the longitudinal direction of the spacer. This may suitably also be of adjustable length, as is intimated by means of a double-headed arrow.

5 The employment and function of this embodiment of the present invention are wholly analogous with that described above.

According to Fig. 17, the subject matter of the present invention is applied on or includes as  
10 mobile unit a golf cart which serves the function of support member 6. In this embodiment, the spacer 1 is secured via a pivot in the upper end region of the golf cart so that the spacer can, on the one hand, be adjusted in the vertical direction and, on the other hand, be pivoted to a position of non-use where it extends along and under the golf cart.

15 Also in this embodiment, the spacer is suitably of adjustable length and has, at its end located at the pivot 38, an anchorage 5 for the resistance device 2 which has a gripping member at its free end.

20 In the embodiment according to Fig. 18, the subject matter of the present invention is disposed on or includes a golf bag which serves the function of support member 6. Otherwise, this embodiment is analogous with that described with reference to Figs. 16 and 17.